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THE VITAL STATISTICS OF THE CENSUS.*

BY WILLIAM A. KING.

In considering vital statistics as a branch of general census work I shall discuss the practical side of the matter, without reference to the scientific use of the results in the solution of sociological problems, or to abstract theories concerning methods of collection, compilation, or analysis, making a plain statement of what has been accomplished and what it is possible to accomplish under existing conditions, based upon experience in directing the details of this work in 1880 and 1890, under supervision of that eminent statistician, Dr. John S. Billings.

The preparation of vital statistics is perhaps the most complicated of all the branches of census work, on account of the great number of facts to be shown in relation to each other, the necessary distribution of "unknown" items concerning both the deaths reported and the living population, and the immense amount of computation involved in calculating birth and death rates and life tables.

Vital statistics, or at first simply mortality statistics, have formed one of the branches of general census work since 1850, the data being originally collected solely by the enumerators; but as the inevitable deficiencies arising from the attempt to secure such data in that way very largely limited the usefulness of the statistics, the plan of utilizing local registration records of deaths, and of enlisting the coöperation of physicians, was introduced by Dr. John S. Billings with the commencement of his supervision of this work in 1880.

At that time the work was commenced more than a year in advance of the enumeration, by sending to physicians throughout the country small registers containing blanks, on

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which to report deaths occurring in their practice during the census year, which returns were used to correct and supplement the returns made by the enumerators.

For the States Massachusetts and New Jersey, the District of Columbia, and also nineteen cities in other States,—namely, Baltimore, Brooklyn, Charleston, Chicago, Cincinnati, Cleveland, Indianapolis, Louisville, Milwaukee, Nashville, New Orleans, New York, Philadelphia, Pittsburg, Providence, Richmond, San Francisco, St. Louis, and Wilmington,—the local records of deaths were copied and used as the basis of the compilations.

Another progressive step introduced by Dr. Billings was to subdivide the States which had previously formed the unit of locality used into groups of contiguous counties in each State, according to topographical and climatic conditions, the county being the unit for minor compilations, and more elaborate compilations being made for the State groups, which were available for consolidation by States, to give comparisons with previous census results, and for combination into grand groups composed of State groups of similar characteristics. The grouping of the counties, and the detailed description of the characteristics of the several (21) grand groups, were made by Mr. Henry Gannett, geographer of the census.

The enumerators' returns, plus those reported by physicians, represented a population of nearly 42,000,000, with a resulting death rate of 13.93 per 1000.

The registration returns from the States and cities mentioned represented a population of about 8,650,000, and the death rate in this area was 20.67 per 1000, but at that time no separation of the data was made, and the figures used in the analysis represented the combined results as reported.

In the Eleventh Census, in 1890, the registration feature of the returns was greatly extended; the States Massachusetts, Connecticut, Rhode Island, Vermont, New Hampshire, New York, New Jersey, and Delaware, and the District of

Columbia, with the cities therein, were selected as affording satisfactory records, and after correspondence with each other city of an estimated population of 5000 or more, 83 additional cities were selected in which the registration records afforded fairly accurate data for the compilation of the mortality statistics. In most of these cities the mortality schedules were withdrawn from the enumerators, but in some places the enumerators were allowed to make their canvass, and their returns were used to check the registration records. The 83 cities referred to are specified in an appended list. Altogether the registration data of the Eleventh Census represents nine States, and 271 cities of 5000 population or more.

It was well that the registration records were relied upon so extensively, for the returns of the enumerators were very defective,—much more so than in 1880 or at any previous census, as will be seen from the following statement showing the population, deaths, and death rates in the areas covered by the two returns:—

<i>Returns.</i>	<i>Population.</i>	<i>Deaths.</i>	<i>Rate.</i>
Registration	19,659,440	409,125	20.81
Enumerators	42,962,810	466,396	10.86

The actual number originally reported by the enumerators was much less, as there were about 40,000 deaths added from the physicians' registers and about 68,000 supplemental cases obtained from negligent enumerators by suspension of their accounts and a vigorous correspondence.

The deficiency in the enumerators' returns indicated by the rate given above was so apparent and so great that it was determined to limit their use in the analysis of results to such statements as would show the relative frequency of deaths from different causes, per 1000 deaths from known causes, or at different ages per 1000 deaths at known ages, and other details in which the accuracy of the results would not be so dependent upon the completeness of the number reported as would death rates in relation to population.

Of the four volumes constituting the general report on vital statistics, Part II (1178 pages), now binding, relates solely to the 28 cities of the United States having a population of 100,000 and upward, and is based wholly upon registration records. In addition to these four volumes there have been printed and distributed three special reports on vital statistics of New York and Brooklyn, Boston and Philadelphia, and Baltimore and Washington, in which the statistics cover the period of six years from June 1, 1884, to May 31, 1890.

In these special reports, and in a series of tables presented in Part IV for the whole of the six-year record, the principle of subdivision according to varying conditions, first introduced by Dr. Billings in the grouping of counties referred to above, was extended to the subdivision of wards into sanitary districts, based upon peculiarities of topography, drainage, habitations and characteristics of population, etc., sections of cities having peculiar sanitary conditions or particular groups of population, being for the first time segregated for special study. This feature of the work, and the fact that the record covers a period of six years, gives these statistics their greatest value.

The six-year record, so called, for which statistics are presented in the tables in Part IV, covers the cities Baltimore, Boston, and Philadelphia, the District of Columbia, the State of New Jersey, and Kings, Queens, New York, Richmond, and Westchester Counties in New York State, with the cities therein, and includes an aggregate of 846,383 deaths, which is nearly equal to the number reported for the whole United States for the census year.

For these areas the tables presented furnish statistics showing the deaths by sex, color, general nativity and parental nativity, and birthplaces of mothers, in relation to age, cause of death, month or season, conjugal condition, and occupation, in various combinations, and supply most valuable data, which have not been fully utilized on account

of the impossibility of computing the mean population for this period in necessary detail.

The preceding summary will indicate the progress which has been made in the census work upon vital statistics, and the condition of the same with reference to its extension.

The plan submitted by Mr. Wright for a permanent census service provides for the collection of statistics of deaths and of births for the year 1900 and annually thereafter, the data for which shall be obtained from the registration records of States and municipalities possessing such records, and for obtaining at the decennial enumeration such additional data from non-registration areas as may be desirable, at the discretion of the Director.

This seems amply sufficient for the work in its general sense, but there are two modifications which are desirable: First, that it should authorize the collection of data from certain localities for the period of 1890 to 1900; second, that the discretion of the Director should be extended to allow discrimination in the selection of the localities in which the registration records are adopted, particularly those of births, which are always more defective than the records of deaths.

Taking the first point, it has been shown that the report of the Eleventh Census on vital statistics presents certain tables covering the period of 1884 to 1890, in prominent registration localities, which have not been analyzed, for the reasons pointed out, but which furnish a most valuable basis for the extension of the data to cover the period 1890 to 1896, thus affording the means of compiling, at a small expense, a report of the highest scientific value. Work upon such a report could commence as soon as authorized, and be completed before the decennial census begins.

Upon the second point it is essential that some discretion should be vested in the Director as to what localities may be held to afford registration records of sufficient completeness, on one hand, of administration, so as to give approximately the whole number of deaths, and on the other, of the details

recorded in each case, in comparison with the data required by the census schedule. This is essential, because there are many localities in which laws requiring registration are in force, but which are defective in execution, and there are also others in which the records of deaths may be approximately accurate in point of number, but for which the facts reported are by no means sufficient.

This was amply demonstrated by the correspondence preceding the selection of the localities classed as registration areas in the tables referred to above, by which forms of returns used were secured from every locality professing to possess any system of registration whatever. As an instance of the matter of incompleteness in registration, the case of Alabama is cited. It was represented that the records of that State afforded very complete data concerning deaths, and as it was extremely desirable to include some Southern State having a large proportion of colored population and embracing an extensive area of rural character, the records of deaths in Alabama were copied without withdrawing the mortality schedule from the enumerators, who also reported deaths in the usual way; but the combined result after comparing the two sets of returns gave for that State a death rate of but 13.81 per 1000 of population, as against 14.20 per 1000 in 1880, when the enumerators furnished the entire data.

A number of additional States, including Illinois, Indiana, Iowa, Michigan, Minnesota, Kansas, and others, and numerous cities, have laws requiring the registration of deaths, and the data required concerning each death runs all the way from the full details furnished in Massachusetts and New York to the simple statement that John Smith, aged 57, died of "heart failure."

It will thus be seen that if the clause, "the data for which shall be obtained from the registration records of those States and municipalities possessing such records," is construed as mandatory, and the question settled by the mere fact of the

existence of a registration law, however inadequate, the value of the aggregate results would be little better than if the enumerators' returns were included. On the other hand, the exclusion of such records would, doubtless, soon lead to such amendment of existing laws and practical administration of the same as to warrant their subsequent adoption.

The extension of the registration system is an educational process, and for complete and accurate data from the whole country we must await the development of the future.

The matter of registration records is fully discussed in the analysis in Part II of the *Report on Vital and Social Statistics*, and the lack of uniformity and other defects pointed out, together with the effect of such defects upon the work of compilation ; and a satisfactory form of return given, with a specific statement of the use and application of each fact recorded. In this discussion it is stated : —

“ There is no national legislation upon the subject of registering deaths, specifying the data to be recorded, and controlling, directing, or assisting local laws, and no national or central compilation of such data as are recorded under local laws, except that made by the Census Office in its decennial reports. This office, therefore, furnishes the only present means of aggregating the statistics obtained more or less thoroughly by local officers ; . . . and this is one of the branches of the present census work which could most advantageously be performed from year to year, and the growing tendency toward a permanent organization will eventually bring about this result.”

The annual collection of statistics provided for will meet the objection of the insufficiency of statistics based upon the record of a single year out of each decade, which the six-year data were designed to cover in a limited sense, and will open up the field for continuous work, which will increase in value with the expansion of efficient registration.

With the modifications indicated the advantages of the proposed plan to this branch of statistics are many. It would be doing systematically year by year, in advance, what is now done in whole or in part once in ten years, with

all the disadvantages incident to the use of a temporary force.

It would secure the employment of people of experience and demonstrated capacity; the selections from hundreds employed at various times, whose services could be utilized in the direction of greatest proficiency.

This is of the highest importance, because in the organization of a large force in a very limited time, to prosecute a very complicated work under great pressure for results, it is not always possible to so place clerks as to realize the greatest advantage from their individual capabilities. When the great body of the work is taken in hand and the clerical force largely increased in every branch, much depends upon the accident of assignment as to whether a clerk has any opportunity to demonstrate the possession of superior ability.

Starting with but few clerks, probably of unknown capacity, the best of these have to be depended upon to assume direction of various branches and the instruction of new recruits; and in subsequent stages of the work the knowledge and experience thus gained generally render it necessary to continue them in such positions, although there may then be others better fitted if they had the same experience. It is only at the end, when the force has been reduced to small numbers, that the real capabilities of employees can be accurately gauged. By the time we are through with them we know how they could be utilized to the greatest advantage if the work were to be done over.

As an economical feature the vital statistics proposed have a distinct advantage over other branches of inquiry, in that there will be no expense for the original collection of data, as the facts will all be of record, and a simple transcription will render them available. In the past census this was obtained at the uniform compensation of two cents for each death transcribed; and in the six-year area, excepting the record for the census year, the transcription was directly to cards (punched) by clerks detailed for that purpose. It is

also probable that arrangements could be made in some places by which the local authorities would furnish the transcription without expense to the office.

The incomplete portions of present reports could be supplemented and finished, and data covering a period of twelve years, and embracing the records of nearly 2,000,000 deaths, treated in exhaustive analysis as a basis for comparisons in succeeding reports.

There would then be available satisfactory records of deaths from the nine States classed as registration areas in 1890, with the probable addition of Maine, which has since adopted a system of registration, and possibly some other States, and something like 100 cities outside of such registration States, all together representing in 1900 a probable population of 26,000,000.

The sanitary district subdivision could be profitably extended to other cities in which diverse conditions or peculiar groups of population render it desirable. The Board of Health of New York city has adopted the census sanitary districts, and gives results for the same in the local reports.

As pointed out by Mr. Wright in his remarks upon the plan, its adoption would furnish a powerful stimulus to the extension of the registration system to localities where it is not now employed, and also to the improvement of existing records in the adoption of a uniform kind of certificate or return, which would supply all the essential facts required for the census compilations in every case, and greatly facilitate the work.

There is another phase of the subject which should appeal strongly to local authorities now charged with the annual compilation of statistics in the various States and cities. These officers expend in the aggregate large sums in the preparation of limited statistical data. The work goes on independently in each locality, without uniformity in treatment or presentation of results, and the reports are completed with little or no knowledge of results in other

localities, and consequently with little opportunity for giving comparative figures.

Under the plan proposed the central compilation of annual statistics from all localities could be accomplished simultaneously in much less time than many of the local authorities require for the preparation of their annual reports, and the publication would afford certain uniform tables, more extensive and valuable than most of them attempt, which would relieve them of the labor and expense of compiling the same and supply comparative data for each other area, permitting the local work of this kind to be limited to features of local importance and analytical matter, and giving the statistics a wider usefulness.

Assuming the punched card to represent, as it now does, the most advantageous means of bringing together individual data for tabulation by some mechanical process, the transcription to cards could be made and verified as fast as the records were received. The work of tabulating requires but a short time.

The delay in the publication of reports heretofore made has been due to the necessity of waiting for the completion of the population details for the subsequent preparation of the analysis dependent thereon. The tables containing the statistics of deaths for the Eleventh Census were entirely completed four years before it was possible to complete the analysis. The complex character of the data, partly from registration sources, affording fairly accurate death rates, and partly from the enumerators, which were entirely inadequate thereto, also made it unwise to publish the general tables of deaths until the analysis was complete and the deficiencies indicated, in order to prevent, as far as possible, erroneous use of the figures.

The general limitation of the compilations to those representing registration areas removes this objection, and will permit the immediate publication of the statistics of deaths annually, leaving the analysis of results to be prepared periodically with all the advantages of larger numbers and more extensive periods.

In the way of carrying out the provisions of the proposed plan in a practical way, and obtaining the best results at the least expense and in the shortest time, the following suggestions are made :—

Complete the six-year record 1884–90 by addition of the statistics from 1890 to 1896, and analyze, using the population details of 1890 as the basis for average annual death rates for the twelve-year period.

Correspond with the local authorities and request them to incorporate in certificates, or forms of returns employed, certain inquiries now lacking but essential to the production of uniform results.

Beginning with 1900, compile and issue annual reports embracing certain tables, without analysis or with but brief comment, in order that the results shall most speedily be made public.

When the population details for 1900 are available, to issue independently an analysis of the returns for the census year, which may embrace such data as may be desirable from the representative non-registration areas.

In 1904, to combine the results from 1896 to 1904 in an analytical volume which would include all registration areas, using the population details of 1900 as the basis for average annual death rates for the eight years.

The general idea in these suggestions is to make the results public in the shortest possible time for the benefit of local statisticians, and by helping them enlist their active coöperation in perfecting the statistics and extending their usefulness ; also, by deferring analysis until the periodical reports, to get average annual death rates for a series of years in all necessary details in a practicable way.

The division of the time indicated for the issue of analytical reports — one in years ending with 6, covering a twelve-year period, and one in years ending with 4, covering an eight-year period — is suggested because it will permit the fullest use of the statistics already compiled, and the use of the actual population details obtained at the decennial enumerations as the intermediate data. This will give uniform

results of a certain definite value, covering all of the varied details treated in the analysis in Part I, "Vital and Social Statistics of the Eleventh Census," which cannot be obtained in any other way.

The analysis of the mortality and vital statistics in 1880 was published in 1885, and that of 1890 in 1896. Hence it will be seen that under the suggestions made the future reports would issue at about the same intervals after the enumerations, but would bring the results up to very nearly the date of publication, with the advantage to the public of having the annual statistics in advance.

The suggestion to use the actual population details as the basis for calculating average annual rates for a period of equal extent before and after the enumeration may meet with objection, but it has been fully considered, and is advanced as the only *practicable* plan in a work of this magnitude and complexity.

The application of the plan proposed in the manner indicated would give results of far greater value, at an earlier date, and the total cost of all reports for the entire decade would be less than the amount expended upon the vital statistics of the Eleventh Census.

LIST OF REGISTRATION CITIES IN NON-REGISTRATION STATES, FOR WHICH DATA ARE GIVEN IN THE REPORTS OF THE ELEVENTH CENSUS.

Fort Smith, Ark.	Evansville, Ind.	Stillwater, Minn.	Pittsburg, Pa.
Alameda, Cal.	Fort Wayne, Ind.	Jackson, Miss.	Reading, Pa.
Fresno, Cal.	Indianapolis, Ind.	Kansas City, Mo.	Scranton, Pa.
Los Angeles, Cal.	Laporte, Ind.	St. Louis, Mo.	Titusville, Pa.
Oakland, Cal.	Terre Haute, Ind.	Omaha, Neb.	York, Pa.
Sacramento, Cal.	Council Bluffs, Ia.	Raleigh, N. C.	Charleston, S. C.
San Francisco, Cal.	Davenport, Ia.	Chillicothe, O.	Chattanooga, Tenn.
San Jose, Cal.	Dubuque, Ia.	Cincinnati, O.	Knoxville, Tenn.
Stockton, Cal.	Keokuk, Ia.	Cleveland, O.	Memphis, Tenn.
Denver, Colo.	Muscatine, Ia.	Columbus, O.	Nashville, Tenn.
Atlanta, Ga.	Louisville, Ky.	Dayton, O.	Cleburne, Tex.
Augusta, Ga.	Paducah, Ky.	Hamilton, O.	Dallas, Tex.
Savannah, Ga.	New Orleans, La.	Portsmouth, O.	Fort Worth, Tex.
Aurora, Ill.	Lewiston, Me.	Springfield, O.	Galveston, Tex.
Chicago, Ill.	Baltimore, Md.	Toledo, O.	San Antonio, Tex.
Galesburg, Ill.	Detroit, Mich.	Allegheny, Pa.	Lynchburg, Va.
Jacksonville, Ill.	Manistee, Mich.	Altoona, Pa.	Petersburg, Va.
Ottawa, Ill.	Muskegon, Mich.	Erie, Pa.	Richmond, Va.
Peoria, Ill.	Minneapolis, Minn.	Norristown, Pa.	Lacrosse, Wis.
Rockford, Ill.	St. Paul, Minn.	Philadelphia, Pa.	Milwaukee, Wis.